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File: USPT

May 21, 1996

DOCUMENT-IDENTIFIER: US 5518841 A

TITLE: Composite cathode

DEPR:

On the contrary, during a discharging (reduction) process of the composite electrode, a doping is made on the metal-cation which has previously been formed by dissolution of the anode or by de-doping of the anode, maintaining the network of the electronic conductive path, which has previously been formed with the polyaniline and the S--S compound by the dissolution of the anode or by the de-doping of the anode. Next, a de-polymerization of the polymerized S--S compound occurs, and the S--S compound anion de-polymerized to its monomer state finally de-dopes from the polyaniline. That is, no electrolyte is consumed also in the discharging process and the electronic conductive path developed in the network state promotes the discharging of the metal oxide.

DEPR:

In the prior art production of the composite electrode comprised of polyaniline and metal oxide in combination, it has been conventional to obtain a composite product of the polyaniline and the metal oxide by polymerizing through an electrolytic or chemical oxidation an aniline monomer in a state of a solution with dispersed metal oxide powder. In the case of polyaniline is present solely, only about 0.1 g of polyaniline can however be dissolved in 1 g of 2-pyrrolidone or its derivative. In contrast to this, 0.5 g or more of polyaniline can be dissolved in 1 g of the 2-pyrrolidone or its derivative in the presence of the S--S compound together with the polyaniline.

DEPR:

The S--S compound monomer used in the present invention can be exemplified by at least one of the compounds represented by the general formula $(R(S).sub.y).sub.x$, which are disclosed in the United State Patent No. 4,833,048. In the general formula, R represents an aliphatic residue or an aromatic residue, S represents sulfur, y represents an integer of one or larger and n represents an integer of two or larger. The compound can specifically be exemplified by dithioglycol represented by $HSCH.sub.2CH.sub.2SH$ (hereinafter referred to "DTG"), 2,5-dimercapto-1,3,4-thiadiazole represented by $C.sub.2N.sub.2S(SH).sub.2$ (hereinafter referred to "DMcT"), s-triazine-2,4,6-trithiol represented by $C.sub.3H.sub.3N.sub.3S.sub.3$ (hereinafter referred to "TTA"), 7-methyl-2,6,8-trimercaptopurine represented by $C.sub.6H.sub.6N.sub.4S.sub.3$ (hereinafter referred to "MTMP"), 4,5-diamino-2,6-dimercaptopyrimidine represented by $C.sub.4H.sub.6N.sub.4S.sub.2$ (hereinafter referred to "DDPy") or the like. Any of commercially available products of these compounds can be employed as it is.

DEPR:

One point five (1.5) g (0.01 mole) of 2,5-dimercapto-1,3,4-thiadiazole (hereinafter referred to "DMcT") monomer powder were dissolved in 3 g (0.03 mole)

of N-methyl-2-pyrrolidone (hereinafter referred to "NMP") to obtain a yellowish transparent viscous DMcT-NMP solution. To this solution, were added 0.5 g (0.003 mole) of polyaniline powder ("ANILEAD" available from Nitto Denko Corp., Japan) and the combined solution was then heated at 80.degree. C. in a sealed container whose inner atmosphere was replaced by an inert gas to obtain a black purple non-transparent composite product having certain adhesive property. The composite product thus obtained was printed on an electrically-conductive carbon film with a thickness of 20 .mu.m, composed of carbon black and a fluorocarbon resin, in a manner to give a layer with a thickness of 200 .mu.m over the film. The printed film was punched into disks having a diameter of 12.5 mm to give an electrode A.

DEPR:

By adding 0.5 g (0.003 mole) of polyaniline powder ("ANILEAD" available from Nitto Denko Corp., Japan) to 100 ml of NMP and pouring a supernatant (20 ml) of the mixture over a glass flat dish with a diameter of 90 mm, and then heating the poured supernatant in a vacuum at 60.degree. C. to remove the NMP contained therein, a polyaniline film (0.15 g, 0.001 mole) with a thickness of 20 .mu.m was obtained. A DMcT-NMP solution (DMcT 0.0033 mole and NMP 0.01 mole) obtained by dissolving 1.5 g of DMcT monomer powder in 3 g (0.03 mole) of NMP was then spread over the polyaniline film. The whole was heated at 80.degree. C. in an argon atmosphere to obtain a composite product film with a thickness of 125 .mu.m. This composite product film was rolled with the application of pressure together with a carbon film similar to that of Example 1 to obtain a unitary body and punched into disks having a diameter of 12.5 mm to give an electrode B.

DEPR:

One point five (1.5) g (0.01 mole) of DMcT monomer powder were dissolved in 5 g of NMP to obtain a yellowish transparent viscous DMcT-NMP solution. To this solution, 2.5 g (0.015 mole) of polyaniline powder in a de-doped and reduced state ("ANILEAD" available from Nitto Denko Corp., Japan) were added and the combined solution was then heated at 80.degree. C. in a sealed container, whose inner atmosphere was replaced by an inert gas, to obtain a black purple liquid.

DEPR:

One point five (1.5) g (0.01 mole) of DMcT monomer powder were dissolved in 5 g of NMP to obtain a yellowish transparent viscous DMcT-NMP solution. To this solution, 2.5 g (0.015 mole) of polyaniline powder in a de-doped reduced state ("ANILEAD" available from Nitto Denko Corp., Japan) were added and the combined solution was then heated at 80.degree. C. in a sealed container, whose inner atmosphere was substituted by an inert gas, to obtain a black purple liquid.

DEPR:

One point five (1.5) g (0.0087 mole) of DDPy monomer powder were dissolved in 5 g of NMP to obtain a yellowish transparent DDPy-NMP solution with some viscosity. To this solution, 2.5 g (0.015 mole) of polyaniline powder in a de-doped reduced state ("ANILEAD" available from Nitto Denko Corp., Japan) were added and the combined solution was then heated at 80.degree. C. in a sealed container, whose inner atmosphere: was substituted by an inert gas, to obtain a black purple liquid.

DEPR:

One point five (1.5) g (0.0087 mole) of DDPy monomer powder were dissolved in 5 g of NMP to obtain a yellowish transparent viscous DDPy-NMP solution. To this solution, 2.5 g (0.015 mole) of polyaniline powder in a de-doped reduced state ("ANILEAD" available from Nitto Denko Corp., Japan) were added and the combined solution was then heated at 80.degree. C. in a sealed container, whose inner atmosphere was substituted by an inert gas, to obtain a black purple liquid.

DEPR:

One point five (1.5) g (0.01 mole) of DMcT monomer powder were dissolved in 5 g of NMP to obtain a yellowish transparent viscous DMcT-NMP solution. To this solution, 2.5 g (0.015 mole) of polyaniline powder in a de-doped reduced state ("ANILEAD" available from Nitto Denko Corp., Japan) were added and the combined solution was then heated. at 80.degree. C. in a sealed container, whose inner atmosphere was substituted by an inert gas, to obtain a black purple liquid.

DEPR:

A composite electrode H is produced by mixing 5 parts by weight of the above electrode powder with 4 parts by weight of the gel electrolyte, and then by

printing the mixture on the carbon film in a manner to give a layer with a thickness of about 120 .mu.m thereover and by punching the printed film into disks having a diameter of 12.5 mm.

DEPR:

One point five (1.5) g (0.0087 mole) of DDPy monomer powder were dissolved in 5 g of NMP to obtain a yellowish transparent viscous DDPy-NMP solution. To this solution, 2.5 g (0.015 mole) of polyaniline powder in a de-doped reduced state ("ANILEAD" available from Nitto Denko Corp., Japan) were added and the combined solution was then heated at 80.degree. C. in a sealed container, whose inner atmosphere was substituted by an inert gas, to obtain a black purple liquid.

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	INNO	Draw Desc	Image
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☐ 12. Document ID: US 5310774 A

L1: Entry 12 of 45

File: USPT

May 10, 1994

DOCUMENT-IDENTIFIER: US 5310774 A

TITLE: Molecular weight degradation stabilized polymeric compositions

ABPR:

Polymeric compositions are stabilized against molecular weight degradation by the inclusion in the composition of an inhibitor which is preferably an ethylenically unsaturated compound. The invention is of particular value when the polymer is a polymer of (meth)acrylamide in which the amount of contamination of the polymer with free (meth)acrylamide monomer is extremely low and the inhibitor has LD.sub.50 above 400.

BSPR:

This invention relates to water soluble and water swellable polymers of ethylenically unsaturated monomers and their stabilisation so as to reduce molecular weight degradation during storage and use. It also relates to polyacrylamides in which this problem of degradation is particularly significant.

BSPR:

When making a water soluble or swellable polymer from ethylenically unsaturated monomer, it is normal to try to achieve full polymerisation of the monomers but in reality some monomer always remain unpolymerised in the polymeric reaction product. This may be relatively unimportant in the case of some monomers but it is known to be undesirable in the case of methacrylamide or, especially, acrylamide because of the toxicity of this monomer. It is normal practice therefore to conduct acrylamide polymerisation so as to reduce the acrylamide content to as low a value as is conveniently possible, which in practice generally means that the polymer has a residual free acrylamide content of, typically, 0.2 to 0.5%.

BSPR:

Extensive studies have been made of the performance of polymers of ethylenically unsaturated monomers and it is known that they are liable to undergo degradation during storage or use. This degradation is particularly serious for the higher molecular weight polymers, for instance molecular weight above one million. The fact that degradation is occurring is manifested by, for instance, a reduction in the solution viscosity of the polymer. In those circumstances when the polymer is being used as a viscosifier the reduction in viscosity would probably be noticed, but even then this might be put down to other factors, for instance that the polymer as initially made had lower solution viscosity than was expected. Also, it may not be practical to measure solution viscosity during use (e.g. when the polymer is being used downhole). In other situations, e.g. as a flocculant, the solution viscosity of the polymer may not normally be measured and the performance of the polymer may depend upon a whole range of factors of which solution viscosity is only one, and so in theory performance could be put down to

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